CLAIMS

1. A photodetector comprising:

at least one electron transporting organic material; and

at least one hole transporting material,

wherein said at least one electron transporting organic material has an ionization potential of more than 5.5 eV.

2. A photodetector comprising:

at least one electron transporting organic material; and

at least one hole transporting material,

wherein an ionization potential of said at least one electron transporting organic material is larger than an energy necessary for the highest-level electron of said at least one hole transporting material to be taken out to a vacuum infinite far point.

3. The photodetector according to claim 2,

wherein said at least one hole transporting material is at least one hole transporting organic material,

wherein an ionization potential of said at least one electron transporting organic material is more than an ionization potential of said at least one hole transporting organic material.

4. The photodetector according to any of claims 1 to 3,

wherein the ionization potential of said at least one electron transporting organic material is more than 6.0 eV.

5. The photodetector according to any of claims 1 to 4,

wherein said at least one electron transporting organic material is a compound represented by formula (I):

Formula (I)

wherein m represents an integer of 2 or more;

L represents a linking group; and

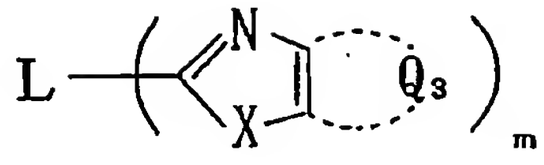
each of A's independently represents a hetero ring group where at least two aromatic hetero rings are condensed to each other, and A's are the same or different.

6. The photodetector according to any of claims 1 to 5,

wherein said at least one electron transporting organic material is a compound represented by formula

(III):

Formula (III)



wherein m represents an integer of 2 or more;

L represents a linking group;

each of X's independently represents O, S, Se, Te or N-R;

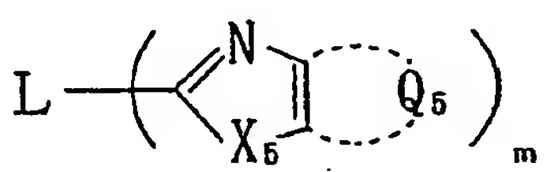
R represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; and

each of Q_3's independently represents an atomic group necessary for forming an aromatic hetero ring.

7. The photodetector according to any of claims 1 to 6,

wherein said at least one electron transporting organic material is a compound represented by formula (V):

Formula (V)



wherein m represents an integer of 2 or more;

L represents a linking group;

each of X_5's independently represents O, S or N-R;

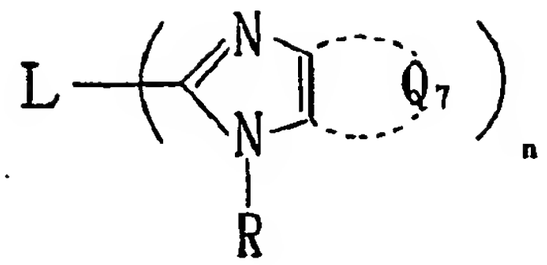
R represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; and

each of Q_5's independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring.

8. The photodetector according to any of claims 1 to 7,

wherein said at least one electron transporting organic material is a compound represented by formula (VII):

Formula (VII)



wherein n represents an integer of 2 to 8;

L represents a linking group;

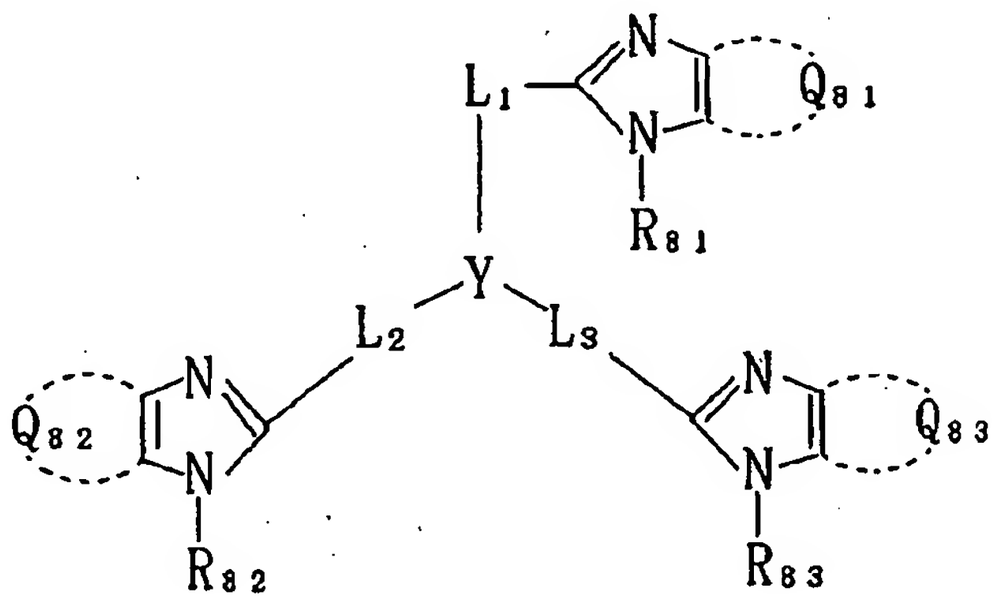
each of R's independently represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group; and

each of Q_7's independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring.

9. The photodetector according to any of claims 1 to 8,

wherein said at least one electron transporting organic material is a compound represented by formula (VIII):

Formula (VIII)



wherein Q_{81}, Q_{82} and Q_{83} each independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring;

R_{81}, R_{82} and R_{83} each independently represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group;

L_1, L_2 and L_3 each independently represents a linking group; and

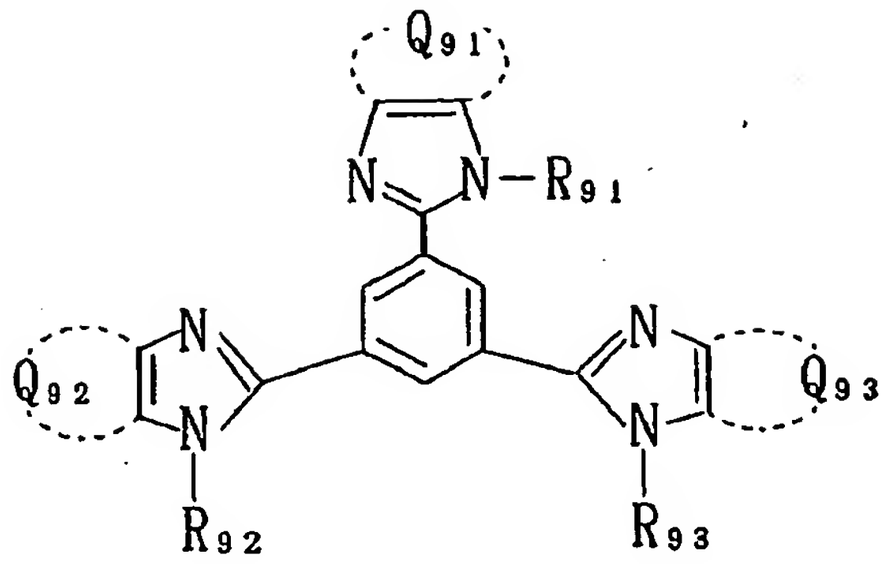
Y represents a nitrogen atom or a 1,3,5-benzenetriyl group.

10. The photodetector according to any of claims 1 to 9,

wherein said at least one electron transporting organic material is a compound represented by formula

(IX):

Formula (IX)



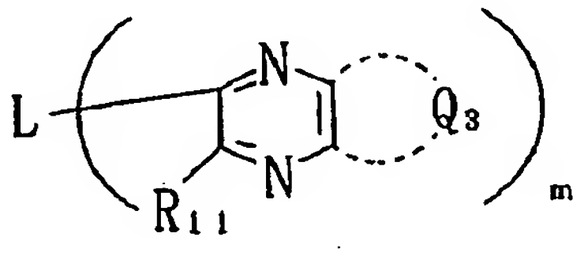
wherein Q_{91}, Q_{92} and Q_{93} each independently represents an atomic group necessary for forming a 6-membered nitrogen-containing aromatic hetero ring; and

R_{91}, R_{92} and R_{93} each independently represents a hydrogen atom, an aliphatic hydrocarbon group, an aryl group or a hetero ring group.

11. The photodetector according to any of claims 1 to 5,

wherein said at least one electron transporting organic material is a compound represented by formula (XI):

Formula (XI)



wherein m represents an integer of 2 or more;

L represents a linking group;

each of Q_3's independently represents an atomic group necessary for forming an aromatic hetero ring group; and

each of R_{11}'s independently represents a hydrogen atom or a substituent.

12. The photodetector according to any of claims 1 to 11, further comprising:

at least one transparent electrode; and

at least one electrode,

wherein said at least one electron transporting organic material is interposed between said at least one transparent electrode and said at least one electrode.

13. The photodetector according to any of claims 1 to 12, further comprising:

at least one transparent electrode; and

at least one electrode,

wherein said at least one electron transporting organic material and said at least one hole transporting material are interposed between said at least one transparent electrode and said at least one electrode.

14. The photodetector according to any of claims 3 to 12, further comprising:

at least one transparent electrode; and

at least one electrode,

wherein said at least one electron transporting organic material and said at least one hole transporting organic material are interposed between said at least one transparent electrode and said at least one electrode.

15. The photodetector according to any of claims 1, 2 and 13,

wherein said at least one electron transporting organic material is deposited in vacuum.

16. The photodetector according to any of claims 3 to 12 and 14,

wherein at least one of said at least one electron transporting organic material and said at least one hole transporting organic material is deposited in vacuum.

17. An imaging device comprising a photodetector according to any of claims 1 to 16.

18. The imaging device according to claim 17, further comprising:

a substrate;

a first layer comprising a first photodetector; and

a second layer comprising a second photodetector.

19. The imaging device according to claim 17, further comprising:

a substrate;

a first layer comprising a first photodetector;

a second layer comprising a second photodetector; and

a third layer comprising a third photodetector.

20. The imaging device according to claim 19,

wherein the first photodetector comprises a blue light photodetector; the second photodetector comprises a green light photodetector; and the third photodetector comprises a red light photodetector.